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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: ENTWISTLE, PAUL

Application No.: 09/553,011

Filing Date: 04/20/00

For: MEMORY DATABASE CREATION SYSTEM
FOR ENCRYPTED PROGRAMME MATERIAL

Art Unit: UNKNOWN



TRANSMITTAL OF PRIORITY DOCUMENT

Assistant Commissioner for Patents
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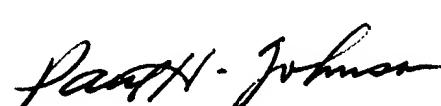
Enclosed herewith is a certified copy of British Patent Application No. 9909362.7 for which the above-identified patent application claims priority from.

If, for any reason, this priority document is not acceptable, please inform the undersigned as soon as possible.

Respectfully Submitted

HEAD, JOHNSON & KACHIGIAN

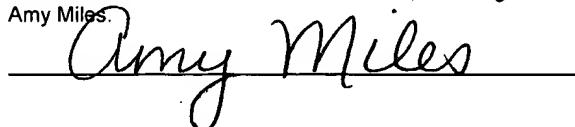
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26APR99 E442245-4 D00346
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The Patent Office

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1. Your reference

GW-G28439

2. Patent application number

(The Patent Office

9909362.73. Full name, address and postcode of the or of each applicant (*underline all surnames*)

23 APR 1999

Pace Micro Technology Plc

Victoria Road
Saltaire
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BD18 3LF

U/K 7588569001

Patents ADP number (*if you know it*)

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

Memory Database Creation System for Encrypted Programme Material

5. Name of your agent (*if you have one*)

Bailey Walsh & Co.

"Address for service" in the United Kingdom to which all correspondence should be sent (*including the postcode*)5, York Place
Leeds
LS1 2SDPatents ADP number (*if you know it*)

224001

6. If you are declaring priority from one or more earlier patent applications, give the and the date of filing of the or of each of these earlier applications and (*if you know it*) the or each application number

Country

Priority application number
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(*day / month / years*)

7. If this application is divided or otherwise derived from an earlier UK application, the earlier application

Number of earlier application

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Description

5

Claim(s)

Abstract

Drawing(s)

1

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Priority Documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

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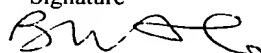
Request for substantive examination (Patents Form 10/77)

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11.

I/We request the grant of a patent on the basis of this application

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Date

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Memory Database Creation System for Encrypted Programme Material

The invention which is the subject of this application relates to the ability to compile a database of information such as, but not exclusively, broadcast programme material, in a memory with identification means to allow the retrieval of the material and to the ability to include a means for processing the material as it is received to allow the generation of the identification means prior to storage.

It is known in the transmission of broadcast material, which can be any or any combination of video and/or audio data, that the received data can be stored in a hard disk drive or other form of random access memory for subsequent selective retrieval. However with the ability to store the material in memory there is the accompanying demand to be able to identify and retrieve the data readily and review the material to allow a selection to be made or the required part of the material to be identified. In order to allow the efficient retrieval of material it is necessary to be able to accurately identify segments of the material at the time of storage so that for example, for video material, the frames of video can be identified and the particular form of frame and coding method used can be identified with respect to each frame for subsequent retrieval and generation of a video display.

The use of the memory is at present complicated by the reception of broadcast programme material which is transmitted in a scrambled or encrypted format to prevent unauthorised viewing of the same. The material can be descrambled by, for example, the payment of an appropriate sum to authorise the descrambling however it is desired that encrypted material should also be able to be stored in a memory and an identification database created. A known solution is to

record the broadcast encrypted material, read it from the memory and then parse it to obtain the appropriate start identifier for the material. This solution has the benefit of not requiring the construction of a database of location identifiers but does have the disadvantage of requiring for retrieval, that all of the material data has to be read from the memory at a high rate until the start identifier is located as this is the only reference identification.

The aim of the present invention is to provide apparatus and a method whereby the material stored in the memory is identified with respect to location identifiers held in a database to allow the retrieval of the material and in particular to allow material which may be in an encrypted form when received to be identified and stored while at the same time ensuring the security of the same in storage.

In a first aspect of the invention there is provided a system for identifying and storing broadcast programme material in a memory means and subsequent selected retrieval of the material from the memory, said system including the steps of receiving the broadcast programme material and, if the material is an encrypted format, the material is processed using the steps of descrambling or decrypting and stream parsing to be able to generate a number of location identifiers for the material which are held in a database for reference in the retrieval of the memory from the memory means.

In a preferred embodiment the encrypted material undergoes a further processing step of copy protection so that when the material is stored in the memory it is protected against unauthorised copying which is of course one of the reasons for the initial encrypting of the data and so the material is held in a secure state in the memory but can be identified and retrieved.

Preferably the processing steps for the encrypted material should be performed as one process so as to prevent unauthorised access to the material when in a descrambled form.

If the broadcast programme material is not encrypted the same is received and identified for storage in the memory but need not pass through at least the processing steps of descrambling and copy protection.

In one embodiment the database of location identifiers which is generated in relation to the encrypted material may also be encrypted to ensure security of the material.

In a further aspect of the invention there is provided a method of generating a database index of the location of specified features of video and/or audio material relating to a broadcast programme held in a memory device, said material received in an encrypted form and wherein the method comprises the steps of decrypting the data, parsing the data to generate a plurality of location identifiers for the material, and storing said location identifiers in a database, and locally encrypting the material prior to storage in the memory device.

In one feature of the invention the memory device, and processor means for performing the method described above are located in a data receiver which receives the broadcast programme material from a remote source. Typically the programme material received is transmitted in an encoded digital format and the receiver includes means for decoding the received data and generating video and/or audio displays via a television set or monitor and speakers in connection with the data receiver.

A specific embodiment of the invention is now described with reference to the accompanying drawing which illustrates a schematic illustration of the system in one embodiment.

In the example it is desired to store received data material relating to a broadcast programme in a memory in the form of a hard disk drive for subsequent retrieval and the said retrieval may be for all of the material, excerpts of the same and/or it may be required to fast forward or rewind, pause or perform other search functions on the material in storage

However the data can on occasion be received in an encrypted form and in this embodiment the database for the memory which allows for the generation of location identifiers for the material to be generated before the material is input or recorded onto memory. Thus, the received encrypted material is first descrambled or decrypted and then parsed to allow the decision and generation of location identifiers, which may be in absolute terms or relative to other identifiers, for features in the material data. Some examples of useful features could be, for video material, the start of I,B or P frames, Group Of Picture (GOP) sequences, time codes and/or pictorial temporal references. Once the location identifiers are generated and stored in the database the material can then be re-encrypted for copy protection prior to the storage of the same in the memory.

When the instant arrives at which some or all of the encrypted material is to be retrieved from the memory, reference to the database can be made to accurately identify and start the supply of the material from the most relevant or convenient location identifier for the material in response to the retrieval demand. For example if particular excerpt of the material is to be retrieved, the supply of material could start from the "I frame with a time code nearest a

particular time". The material supply is commenced by parsing the database to find the best matched time code and then reference is made to the database index for that material to identify and access the sector of the disk drive where the material is held.

As suggested previously it is of advantage for security reasons to have the decryption, parsing and copy protection integrated as one process and the accompanying Figure illustrates in the shaded area how this could be achieved and thereby prevent unauthorised access to the material when in the decrypted form. A further stage could be the integration of the memory controller into the same unit as the material processor and it would allow simplified tracking of the storage sector used for the key features which are extracted and used to form the database.

The invention therefore provides a relatively fast, efficient access to stored material which can be stored in an encrypted, copy protection form and yet allows the location of the material to be identified with reference to a database index.

